

CAESAREAN SECTIONS IN ABRAHAM ESAU DISTRICT HOSPITAL

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DECLARATION

I, Johannes Reachable, declare that this research report is my own work. It is being submitted for the Master in Public Health in the field of Hospital Management at the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this University or any other University.

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Johannes Reachable

15 day of May 2011

DEDICATION

This work is dedicated to:

My kids Janice, Theodosius, Yarden and Abigail your constant quest for answers are the inspiration for this study and motivation to complete it. I love you all very much.

My colleagues and friends , Gordon Moncho, Dawn Dijong, Nosipho Hlomela, Priscilla Monyobo and Ditshwanelo Mdokwana for your support and encouragement. You are the Best.

My parents Benjamin and Johanna Reachable for reminding me constantly and consistently that perseverance pay off.

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ABSTRACT

BACKGROUND: Maternal and child health is one of the key focus areas of South African (SA) Department of Health in line with the Millennium Development Goals. Maternal and child health is therefore identified as a key performance area for healthcare facilities throughout the country. In SA, availability and/ or lack of services are often the difference between life and death. Caesarean section (CS) is regarded as one such intervention that can save both mother and baby's lives. Outcome of CS as a life saving intervention are often based on certain factors (clinical and health systems) that predetermine it. It is important to identify these factors at institutional level to optimise better outcome. However, the practice of caesarean sections and the maternal and foetal outcome were not systematically and extensively studied at the hospital level.

AIM: The aim of the study was to determine the frequency of CS in a district hospital in South Africa for an eighteen month period and to identify some factors which might influence that frequency and to describe the maternal and neonatal health outcomes.

METHODOLOGY: Setting of this study was the maternity ward of the Abraham Esau District Hospital in Namaqua, Northern Cape Province. Study involved an eighteen month (1 January 2009 to 30 June 2010) retrospective review of hospital medical electronic database. No primary data was collected for this study. Variables used for the study include CS rates, the profile of women who had a CS, the health outcomes for the women and babies.

RESULTS: The total number of deliveries during this period was four hundred and sixty two (462). Seventy-six of them were CS (16.4%). Approximately two thirds 50 (66%) of them were emergencies. The study found that emergency CSs were more commonly done among teenagers under the age of eighteen. Emergency CSs were also more commonly performed among patients who were transferred from surrounding clinics (20.8%). The majority of patients who had CS were single, unemployed and had no medical aid.

CONCLUSION: The findings of this study will be useful to develop a better understanding of the frequency of CS at this Hospital and could be utilized by referring clinics and community health centres as well as other district hospitals for the improvement of health care service, particularly maternal and child health. The

findings could serve as a base for informed decision-making, accurate planning, appropriate interventions, and optimal resources utilization. Further to this it could be a reference for future projects of similar nature for academic and clinical purposes.

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DEFINITION OF TERMS

Abruptio placenta: It is a maternal condition associated with premature separation of the placenta from the wall of the uterus. Abruptio is a potentially serious problem both for the mother and baby (James, Steer, Weiner, et al., 1999).

Antepartum hemorrhage: it is defined as bleeding from the uterus during a pregnancy in which the placenta appears to be normally situated, particularly after the 28th week (James, et al., 1999).

Cephalo-pelvic disproportion: It is an obstetric condition in which a baby's head is too large or a mother's birth canal too small to permit normal labour or birth (James, et al., 1999).

Caesarean section: A caesarean section is a surgical procedure in which incisions are made through a woman's abdomen and uterus to deliver her baby (James, et al., 1999).

Caesarean section (elective): Elective caesarean section refers to a caesarean section (CS) that is performed on a pregnant woman on the basis of an obstetrical or medical indication or at the request of the pregnant patient. The elective CS is therefore also a "planned CS" (James, et al., 1999).

Caesarean section (emergency): a caesarean section done during labour by necessity is termed an *emergency caesarean section* (James, et al., 1999).

Eclampsia: It is a maternal condition associated with convulsions and coma, rarely coma alone, occurring in a pregnant or puerperal woman, and associated with high blood pressure, oedema, and/or presence of protein in urine (James, et al., 1999).

Maternal mortality: Maternal mortality is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. Maternal mortality rate is the Annual number of deaths of women from pregnancy-related causes per 100,000 live births (James, et al., 1999).

Perinatal mortality: Perinatal mortality, defined as number of stillbirths and deaths in the first week of life per 1,000 live births, is a useful additional indicator, and work is ongoing to improve estimates of stillbirth rates, a major component of

perinatal mortality (James, et al., 1999).

Post partum haemorrhage (PPH): It is defined as excessive vaginal bleeding (blood loss greater than 500 ml) within 24 hours after delivery (James, et al., 1999).

Labour induction: Induction of labour (IOL) is an intervention (Artificial rupture of amniotic membrane or intravenous oxytocin administration) designed to artificially initiate uterine contractions resulting in progressive effacement and dilatation of the cervix and birth of the baby (James, et al., 1999).

Placenta praevia: Placenta praevia is a condition that occurs during pregnancy when the placenta is abnormally placed, and partially or totally covers the cervix (James, et al., 1999).

Thromboembolism: It is a condition associated with obstruction of a blood vessel with thrombotic material carried by the blood from the site of origin to plug another vessel (James, et al., 1999).

LIST OF ABBREVIATIONS

AEH	Abraham Esau Hospital
CS	Caesarean section
DOH	Department of Health
HIV	Human Immunodeficiency Virus
IQR	Inter-quartile range
MDG	Millennium Development Goals
NCCEMD	National Committee on Confidential Enquiries into Maternal Deaths
SA	South Africa
SD	Standard deviation
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

The purpose of this study was to determine the frequency of caesarean section (CS) in a district hospital in South Africa for a one and a half year period and to identify some factors which might influence that frequency and the outcomes of the intervention for mothers and baby. This introductory chapter will cover background and justification of the study, problem statement, and its aims and objectives.

1.1 BACKGROUND

Healthcare is regarded as a basic human right by many countries all over the world, South Africa is no exception. Access to health care service is a key priority of South African Government. It is the responsibility of the Department of Health to ensure South African citizens received equitable and quality health care service. Maternal and child health is one of the key focus areas of the Department of Health in line with the Millennium Development Goals (MDG). Therefore, maternal and child health is identified as a key performance area for public healthcare facilities in South Africa.

Maternal health care requires availability of certain key services which often makes the difference between life and death. Caesarean section (CS) is regarded as one such services that can save lives of both mother and baby. Outcome of CS as a life saving intervention are often based on certain factors (clinical and health systems) that predetermine it. It is important to identify these factors at institutional level to optimise better outcome.

Abraham Esau Hospital is one of two district hospitals in the Namaqua District. It has an approved bed capacity of forty-five of which only 34 are currently usable. Of the 34 usable beds, eight beds are in the maternity section. The Hospital is the referral point for seven health facilities within the catchments population it serves. The Hospital refers to Gordonia Hospital in Upington (405 km), and Kimberley Hospital Complex, (780 km). The catchments population is approximately 35,000

and occupies a 77,200 square kilometres area. Approximately a third of the population resides in Calvinia, where the Hospital is situated. The medical staff of the Hospital includes two permanent, three sessional and six community service doctors. All doctors are based in Calvinia except two sessional medical practitioners. There are 21 nurses in the Hospital.

Maternal and Child care services in the Hospital are primarily provided by professional nurses. The Hospital generally experiences critical staff shortages in all departments and categories of staff. The situation is compounded and aggravated through poor information management, an element that is essential for proper planning for services and monitoring of the quality of essential interventions such as CS. As a result, the Hospital did not consistently monitor the CS frequency and patterns. No systematic study has ever been conducted regarding this specific subject in the Hospital to date. This study was geared towards identifying and describing the frequency and patterns of CS in the Hospital with the goal that the findings will provide a better understanding and a base for informed decision-making, accurate planning and appropriate interventions for clinicians and administrators.

1.2 STATEMENT OF THE PROBLEM

The CS rate at the Hospital appeared to be very high compared to the national and provincial norms, which are set at 15% and 12% respectively (Northern Cape Department of Health, 2009). Information gathered from the quarterly performance reviews appears to suggest that CS rate at the Hospital is between 20% and 25% (The average number of deliveries at the Hospital is 30/month). Some of the challenges experienced by the Hospital include a shortage of staff and reliance on sessional and community service doctors (they often work alone, unsupervised, without the benefit of immediate and readily available specialist support). The impact of the geographic, socio-economic and demographic factors on the frequency of CS in this Hospital is not known. The lack of researched information on the CS as a life saving intervention may put lives of mothers and babies at risk. It was a concern that inadequate or inappropriate management and clinical decision making processes could also be an underlying cause of the apparent

high CS rate. Equally important was the goal to avoid unnecessary caesarean deliveries or delaying necessary ones. Therefore, it was essential to develop a better understanding of the frequency of CS at the Hospital.

1.3 JUSTIFICATION FOR THE STUDY

The reduction of maternal and neonatal deaths is one of the key goals of the MDG. An important factor in reaching this goal is the provision of clinical guidelines, protocols and manuals for management of the major causes of maternal mortality. Furthermore, it is estimated that 70% of neonatal deaths could also be prevented, if good quality maternal health care is provided (Department of Health, 2007).

The study provided useful information about CS, which is one of the essential elements of maternal and child care services. A guiding principle for the findings of this study was that they would enable managers (both clinical and administrative) to plan for services based on accurate information and thereby enhance the allocation and optimal utilization of resources. In addition to this, it would hopefully further enable them to implement some of the recommendations with basic resources and limited staff.

1.4 RESEARCH QUESTION

What was the frequency of CS in Abraham Esau Hospital and what factors might influence that frequency and the outcome of patients who had CS in this Hospital during the eighteen month study period?

1.5 STUDY OBJECTIVES

1.5.1 BROAD OBJECTIVE

The aim of the study was to determine the CS frequency in a district hospital in South Africa for an eighteen month period and to identify some factors which might influence that frequency and their outcomes.

1.5.2 SPECIFIC OBJECTIVES

1. To describe the rate of CS in terms of emergency and elective interventions
2. To describe the profile of women who had a CS during the study period.
 - 2.1 Demographic profile (such as age, ethnicity, gravidity,)
 - 2.2 Clinical profile (such as gravidity, diagnosis and indications (cephalopelvic disproportion, previous CS), and the type of CS (such as elective or emergency)
3. To describe the maternal and neonatal health outcomes:
 - 3.1 Maternal health outcomes: (a) With or without complications and (b) Discharge, transferred or death
 - 3.2 Neonatal health outcomes (a) With or without complications and (b) Discharge, transferred or death
4. To determine the association between the type of CS and (a) profile of the women and (b) maternal and neonatal health outcomes

1.6 SUBSEQUENT CHAPTERS

Chapter one provided an overview of the study, defined the aim and objectives. The subsequent chapters are as follows:

Chapter Two: Literature Review

This chapter deals with relevant literature and studies related to the study and seeks to establish what current practices are in similar settings nationally and internationally.

Chapter Three: Research Methodology

In this chapter, the research methodology, methods and techniques utilised are explained.

Chapter Four: Presentation of Results

The findings of the study pertaining to aims and objectives are analysed in this chapter.

Chapter Five: Discussion

This chapter focuses on the drawing parallels from the literature and results of the study in an effort to explain the aims and objectives.

Chapter Six: Conclusions and Recommendations

In this chapter conclusions emanating from the study are cited, recommendations are made with regards to future studies in the area of caesarean sections.

1.7 SUMMARY OF THE CHAPTER

This introductory chapter gave an outline on the background of the study, the reason for the study, the problem statement and the aim and objectives. It also provided a synopsis of the subsequent chapters of the report.

CHAPTER 2

LITERATURE REVIEW

In this chapter, relevant reports and articles from the literature with regard to the CS and the associated factors are reviewed. The focus in the main is on the prevalence of CS and the factors which influence CS rates internationally and more specifically in hospitals in developing countries.

2.1 MATERNAL HEALTH SERVICES

The risk of women experiencing serious complications or dying during pregnancy, childbirth or the puerperium continues to be high in sub-Saharan Africa. The World Health Organization (WHO) recently reported the lack of progress in maternal health in this region, and the concern that most countries would not meet the targets of the Millennium Development Goals (MDGs) by 2014 (Munjanja, Majoko, Lindmark, 2008).

The experiences of women in the sub-Saharan Africa are further compromised by the lack of capacity in the health facilities such as shortage of skilled health professionals, medical equipment, pharmaceuticals, and support services (such as laboratory services and transport) (Munjanja, et al., 2008). This implies that these countries would require more resources and optimal utilization of currently available resources. This would require focused and intensified studies on maternal health services to document evidence based best practices in this part of the world, which can be replicated elsewhere.

The major final causes of maternal mortality and morbidity and the socio-economic factors which raise the risk are well known. Over the past three decades, much information on the interventions which health systems can implement to reduce this risk have become available. Eventually, all these interventions have to be delivered to women through programs, which are packages of routines, tests, procedures, prophylactic regimes and treatments designed to take a woman safely through pregnancy (O'Mahony, Hofmeyr, Menon, 2009). The clinical procedures (such as CS) are an essential component of maternal health services. Although

many studies have been done about the clinical aspects of these procedures, no study has been done to formally study these procedures in the perspective of health services managers.

2.2 CAESAREAN SECTION

Caesarean section has been reported sporadically in the medical history. However only in the 20th Century, it became a safe mode of delivery with drastic reduction of mortality and morbidity associated with the procedure. The safety of lower segment of technique, the development of skilled anaesthesia (general and regional), the availability of blood products and antibiotics, the broadening of indications for the operations, the recognition of the fetus as a patient, the feasibility of vaginal delivery after CS and acceptance of this procedure by women have characterised by the increase in safety and acceptance by patients in the 20th century. The lower segment CS pioneered by Munro Kerr in the earliest 20th Century is now performed in over 90% cases (Dickinson, 1999).

There are four major indications for CS: previous CS (36%), dystocia (30%), malpresentations (11%), and foetal distress (10%). The procedure is indicated whenever the risk to the mother and/ or fetus of vaginal delivery exceeds that of CS, with the steady improvement in safety of operation, the proportion of population in which that balance is exceeded has grown (Hofmeyr, 2003).

Caesarean section rates are progressively rising in many parts of the world. Although there are clear clinical indications for CS (such as placenta praevia, HIV infection, contracted pelvis and, arguably, breech presentation or previous CS), there are other factors such as patients' choice also play an important role (House of Commons, 2003). The reported benefits of planned CS include greater safety for the baby, less pelvic floor trauma for the mother, avoidance of labour pain and convenience (Lavender, and Kingdon, 2009). This implies that various non-clinical factors can also be associated with the CS procedure. It is also assumed that most of the clinicians see this as the most convenient procedure for them, as it

saves time and reduces the risk of adverse events. However, the CS are resource incentive and often associated with complications in a resource poor setting.

Caesarean section can be performed either as elective or emergency procedure.

- Elective caesarean section: This is a planned CS that is usually done before labour commences. There are fewer complications than emergency CS for following reasons: better preparation of patients, planned anaesthesia, planned surgery, reduced chance of infection (due to intact membrane and undilated cervix), and reduced neonatal complications. The most important foetal risk associated with elective CS performed before signs of commencing labour is pulmonary immaturity of fetus and prematurity (Hofmeyr, 2003). .
- Emergency caesarean section: A CS is performed as an emergency procedure during labour in presence of hazardous complications for a mother or her fetus. The most frequent such complications are acute foetal distress and obstructed or prolonged labour. The prevalence of complications is twice as high as that for elective CS (Hofmeyr, 2003). .

2.3 PREVALENCE OF CAESAREAN SECTIONS

Caesarean section is one of the commonest operations performed on women and population based rates for CS are considered to be an important indicator for access to essential obstetric care in developing as well as developed countries (Stanton, Dubourg, De Brouwere, et al, 2005). Most obstetric complications occur around the time of delivery and cannot be predicted, thus having a skilled attendant who is able to recognise and manage obstetric complications or refer in time is essential for prevention of maternal mortality and morbidity (Gabrysch and Campbell, 2009).

Increase in the number of CS performed each year globally is a cause for concern although there are large variations in the rates of CS, in high and low income countries, as well as among different institutions in one country (Festin, Laopaiboon, Pattanittum, et al., 2009). This phenomenon of increased CS rate

was once limited to Western countries such as the United States of America and the United Kingdom. However these high rates of CS are now an international trend that in part probably reflects the increased hospital based delivery and access to health care (Khawaja, Jurdi, and Kabakian-Khasholian, 2004). In contrast, there were little changes in the CS rates in sub-Saharan Africa. For example, a study found that CS rates were 5% in Kenya, 2-5% in Cameroon Ghana and Tanzania and that the rates were lower than 2% in Burkina Faso, Madagascar, Niger, and Zambia. (Buekens, Curtis, Alayón, 2003). They suggested the low CS rate was linked to a decline in access to health services in these countries.

However, a high CS may not always reflect a good maternal health services. In fact, it may hide the unnecessary interventions in settings where there is an unmet need for CS (Stanton, et al, 2005). Various researchers have attempted to determine an optimum rate of CS for a health facility. Dumont, de Bernis, Bouvier-olle, (2001) proposed that the optimum rate for CS for best maternal and neonatal outcomes to be from 5% to 15%. Tabowei and Oboro (2003) also suggested that the CS rate in excess of 15% in a health facility raises doubts about maternity care.

Lack of facilities to perform CS is often associated with increased maternal and perinatal mortality and morbidity. However, increased rate of CS is also associated with complications such as increased risk of maternal infection, haemorrhage, thrombo-embolism, death and obstetric complications in subsequent pregnancies (Leung, Lam, Thach, et al. 2001). On one hand, CS performed for appropriate indication can reduce maternal and perinatal mortality and morbidity. On the other hand, CS performed without valid indication increases the rates of CS and inappropriate utilization of resources. Therefore, CS rates are a major public health concern and should be monitored by health authorities as reported by Van Dillen, Meguid, Petrova, et al., (2007) in a study done in Namibia. Systematic analysis of the practice of CS at the level of health facilities may provide better insight and valuable information regarding factors associated with variations in the CS rates (Abdul-Rahim, Abu-Rmeileh, and Wick, 2009). This might help to prevent unnecessary CS and thereby optimal utilization of resources.

2.4 CAESAREAN SECTION IN SOUTH AFRICA

Caesarean section was first performed in Cape Town by Dr James Barry (Hofmeyr, 2003). Currently, CS is one of the procedures to be performed routinely in maternity units of district hospitals in South Africa. Complex procedures such as caesarean hysterectomy that require specialist interventions are usually performed in regional (specialist) hospitals. Very few studies have been done to systematically determine the CS rates in various health facilities in South Africa. A retrospective study, using data from 1975 to 1994 in the Tygerberg Hospital found that the CS rate stayed constant at about 13%, whereas the perinatal mortality rate declined from 34.7/1000 to 18.4/1000 during this period.

Caesarean rate in South African hospitals is influenced by various factors such as level of care (primary, secondary, tertiary), public or private. Women delivering in the private sector are at least 50% more likely to have a CS than those delivering in public hospitals (Price and Broomberg, 1990). Interestingly, Lawrie, de Jager, Hofmeyr (2001) found that 61% (54/88) have CS in a group of pregnant medical practitioners who delivered at private health care facilities. They suggested that, in the South African private-sector, the emphasis is on personal choice and convenience played a major role instead of evidence-based obstetrics.

2.5 FACTORS INFLUENCING CAESAREAN SECTION RATES

There are number of national (such as South African Department of Health) and international (such as Reproductive Health Library of the World Health Organization) clinical guidelines for performing CS (Festin, et al, (2009). These guidelines provide clinical indications for performing CS. However, there are other factors (such as geographical location, facility level, socio-economic condition of the patients and specialist cover), which influence obstetric practice used at a facility. There are few studies done to determine these factors.

In a developed country like Hong Kong, Leung, Lam, Thach, et al (2001) found that CS routinely were performed for unequivocal and universal indications such

as placenta praevia or abruption and mal-positions (such as transverse lie) but they also found that most of the CS were carried out for ambiguous reasons. In developing countries like those in West Africa, Dumont et al (2006) showed that emergency CS was influenced by staff attitudes, staff competency. In South Africa, it is suggested that women, who ask for CS and have a relative indication, (such as breech presentation or previous CS), should be booked for elective CS. (Department of Health, 2007).

Besides clinical indications, socio-economic factors may also have a strong influence on CS rates. Ronsmans, Holtz, and Stanton (2006) in a study done in developing countries found extremely low CS rates among the very poor; the rates were below 1% for the poorest 20% of the population in 20 countries and were below 1% for 80% of the population in six countries. They suggested that the extremely low CS rates in developing countries (most of them are from sub-Saharan Africa) were due to lack of access to potentially life-saving CS operations, indicating an unmet need for pregnant women in these countries. However, they have not looked for the association between the CS rates and maternal and perinatal mortality and morbidity rates in these countries.

The above examples highlight the influence of multiple factors on CS rates. These factors should be identified for development of appropriate interventions to improve maternal health care at a health facility. The development and implementation of maternal health programmes at a health facility level and monitoring of their progress are important aspects of the maternal health care (Dumont, et al, 2001). Awareness of hospital management about the link between clinical outcome and resource utilization is crucial. James and his colleagues (2008) suggested that greater awareness of hospital management of the prevalence and burden of maternal illness in hospitalized women was warranted to improve outcomes in these patients and to reduce complications (James, Patel, Watson, et al, 2008). Women undergoing caesarean delivery had an increased risk of severe maternal morbidity compared with women who undergoing vaginal delivery.

CHAPTER 3

METHODOLOGY

The methodology for this study was determined by the aims and objectives of this study. In this chapter the study design, setting, scope, population are covered. The chapter further describes data collection, research tools and specifies methods of data analysis and statistical tests.

3.1 ETHICAL APPROVAL

The Human Research Ethics Committee of the Witwatersrand approved this study; authorization was also obtained from the Head of the Department of the Northern Cape Department of Health before commencement of the study.

3.2 STUDY DESIGN

A cross-sectional study design was used for this study. Cross-sectional studies involve data collected at a defined time. They are often used to assess the prevalence of acute or chronic conditions, or to answer questions about the causes of disease or the results of medical intervention. The data used in the study is routinely collected by the institution and is readily available.

3.3 STUDY SETTING

This study took place in the Maternity and Theatre Sections, at Abraham Esau Hospital, a district hospital in the Northern Cape Province (Municipal Demarcation Board, 2010). This study was conducted over period of eighteen months from the 1st January 2009 to 30th June 2010.

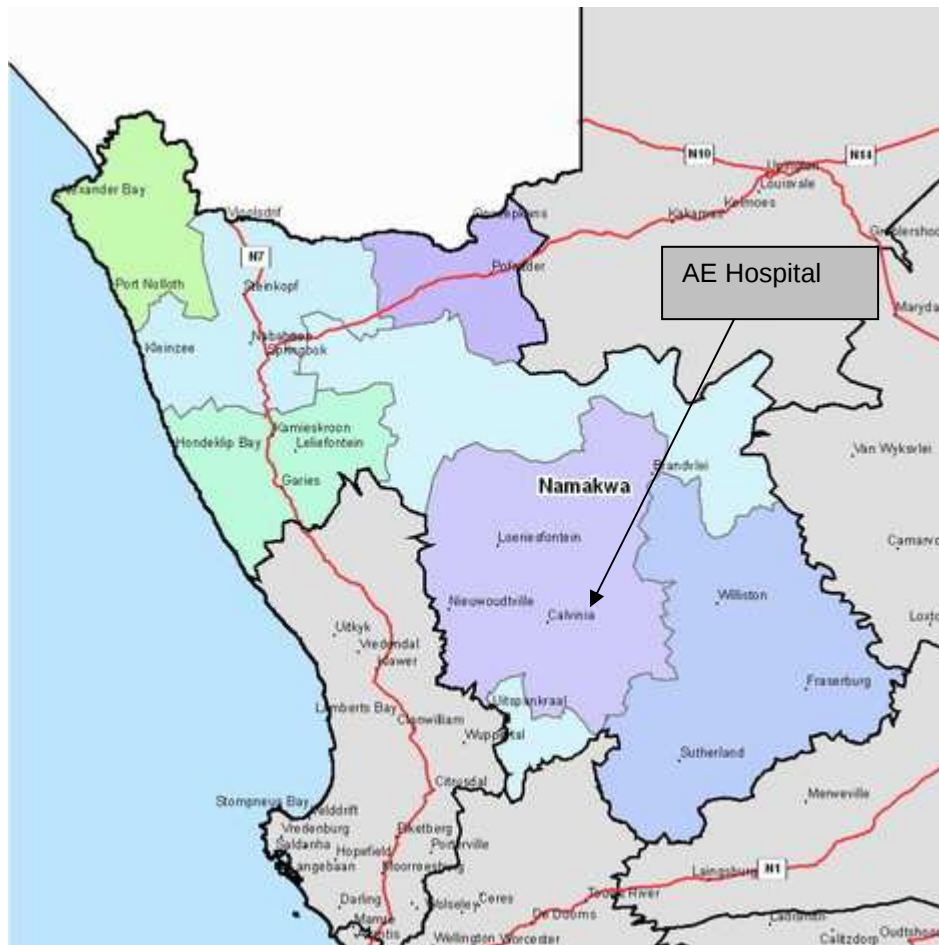


Figure 3.1 Namakwa District Municipality

Namakwa District

Namakwa is one of five districts of the Northern Cape Province of South Africa. The seat of Namakwa is Springbok. The district contains seven local municipalities. Two of those municipalities, Hantam and Karoo Hoogland are served by the Abraham Esau District Hospital and are home to 28% of the population of the District. According to the 2001 census, 84% of the population are coloured, 12% is black and about 4% are white. The district has youthful population with about 40% being between the age groups 0-19 years. Approximately 31% are in the prime years of their reproductive life. The unemployed and not economically active groups constitute about 40%. Over 60% of the adult population fall into the never married category (Stat SA, 2001).

Abraham Esau Hospital

The Hospital has an approved capacity of forty five beds. The Hospital has a fully functional theatre, an eight bed maternity section (two antenatal, 6 postnatal) with two delivery beds. The Hospital Maternity unit has a medical complement of six medical practitioners (2 community service, 2 sessional and two permanent). This number subsequently increased to nine from January 2010. The Hospital has 13 professional nurses, two are qualified advanced midwives and 18 enrolled nurse assistants.

3.4 STUDY SCOPE

The study was based on retrospective review of existing hospital electronic database. No primary data was collected for this study.

3.5 STUDY POPULATION AND SAMPLING

The study population was the electronic database of all the women who had CS at the Abraham Esau Hospital during the study period (n =76). The study used records of all the patients who had CS during the study period. Therefore, no sampling was done. .

3.6 MEASUREMENT AND DATA SOURCE

3.6.1 STUDY INSTRUMENT

Microsoft Excel based data collection tools were designed to extract data from electronic data base (Annexure B).

3.6.2 VARIABLES

Variables that were used with their indicators highlighting what was being measured with each variable are listed below:

- CS rate (elective/ emergency)
- Demographic profile (Age, Ethnicity, Marital and Employment and Medical aid status),
- Clinical profile (Gravidity, Gestational stage and Antenatal visits)
- CS Indication
- Maternal and neonatal health outcomes

3.6.3 DATA COLLECTION

This study utilised information stored in the Hospital electronic database. The Hospital routinely collects and stores this data for Hospital Management and as a part of District Health Information System. Only secondary data, extracted from the listed record source, was collected for this study. The electronic database of all patients that had a CS during the study period was reviewed and this information was exported to respective data sheets. (Appendix B). The information was coded to ensure the privacy and identity of the subjects. Patient files, maternity and theatre registers were used for backup purposes when there were missing records in the electronic database. .

3.6.4 DATA ANALYSIS

The data collected for this study was captured in MS Excel and analysed with NCSS (NCSS, 2007). Following statistics were used for this study:

- Descriptive statistics: Central tendency (mean or median) and spread [standard deviation (SD) or interquartile range (IQR)] were used to analyse the numerical data. Proportions and ratios were used to analyse categorical data.
- Analytical statistics such as Mann Whitney's U- test, Fischer's Exact test and Chi- square test were used to compare between two groups (such as elective and emergency CS).

3.7 PILOT STUDY

No pilot study was conducted as the data for this study are routinely collected through hospital information system.

3.8 ETHICAL CONSIDERATIONS

Approval to do the study was sought from and granted by the Northern Cape Department of Health. The study was ethically approved by the Wits Human Research Ethics Committee before the commencement of the study (M10630) (Appendix A). The confidentiality and anonymity of the data were maintained all the time for collection, capturing, and reporting of the information to protect the identities and privacy of the study subjects. The data sheets did not contain any identification characteristics, (such as names, hospital file number of the women). Furthermore the security of the data was ensured since the researcher personally worked with and stored the data.

3.9 SUMMARY OF THE CHAPTER

The aim of the study was to describe the frequency and factors influencing CS at the Hospital. This study was a retrospective record review of 76 women, all who had a CS and was conducted over eighteen months at the Abraham Esau District Hospital. The information came from the electronic database, supported by paper based records such as maternity, theatre registers and patients' files and was extracted using MS excel spreadsheets. Data were analysed utilizing NCSS software.

CHAPTER 4

RESULTS

The results obtained from the analysis of data are presented in this chapter. It consists of six (6) sections under which the CS rate, socio-demographic – and the clinical profiles of the patients as well as the health outcomes of mothers and babies are presented.

4.1 CAESAREAN SECTION RATE

The CS rate during this period is described in Table 4.1. More Emergency CS (66%) were performed than elective CS (34%) during the study period.

Table 4.1 Cesarean section performed during the study period

	Total	Elective n (%)	Emergency n (%)
Number of CS	76	26 (34%)	50 (66%)
CS rate	16.4%	5.6%	10.8%

4.2 SOCIO-DEMOGRAPHIC PROFILE

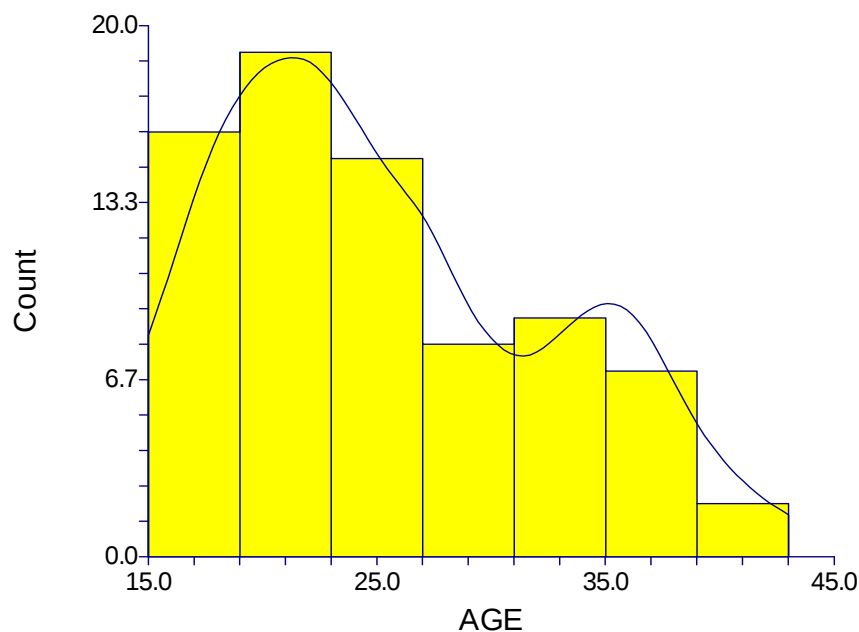
4.2.1 AGE

The distribution of age is described in Table 4.2; the maternal ages ranged between 15 years and 43 years with 43% and 32% of them were between 18 -25 years and 26-35 years respectively. The medians for elective and emergency CS range were 26 and 23 years respectively. There was no statistically significant differences in age between the patients who had elective and emergency CS (Mann Whitney's U test, $p=0.10$) (Figure 4.1).

Table 4.2 Age of the patients

Age in years	Total (n=76)	Elective (n=26)	Emergency (n=50)
Median (IQR)	24 (20 – 30)	26 (21-33)	23 (19-30)
Age groups			
13-17 years	10 (13%)	1 (1%)	9 (30%)
18-25 years	33 (43%)	10 (13%)	23 (12%)
26-35 years	24 (32%)	11 (14%)	13 (17%)
36-45 years	9 (12%)	4 (5%)	5 (7%)
Total	76	26	50

IQR= interquartile range

**Figure 4.1 Age distribution**

A significant number of teenagers (13 to 17 years) have CS (13%). There were 48 deliveries for the age group 13 to 17 during the study period. The CS rate for them was 20.8%. A majority of them had emergency CS (Fisher's Exact test, $p < 0.0001$).

4.2.2 ETHNICITY

Entire study population was from coloured community.

4.2.3 MARITAL STATUS

Table 4.3 shows that the majority of patients were single 56 (76%). In addition, 17 (23%) were married and 1(1%) was a widow.

Table 4.3 Marital status of the patients

Marital Status	Total (n=76)	Elective (n=26)	Emergency (n=50)
Single	58 (76%)	19 (73%)	39 (78%)
Married	17 (23%)	7 (27%)	10 (20%)
Widow	1 (1%)	0 (0%)	1 (2%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

There were no significant differences between the patients who had elective and emergency CS in terms of their marital status (Fisher's Exact Test, $p = 0.62$).

4.2.4 EMPLOYMENT STATUS

The employment status of women is described in Table 4.4 A total of 65 (85%) were unemployed and forty seven (47) out of this group had emergency CS. An overwhelming majority (94%) of women who had emergency CS ($n=50$) were unemployed.

Table 4.4 Employment status of the patients

Employment status	Total (n=76)	Elective (n=26)	Emergency (n=50)
Employed	11 (15%)	8 (31%)	3 (6%)
Unemployed	65 (85%)	18 (69%)	47 (94%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

There were significant differences between the patients who had elective and emergency CS in terms of employment status (Fisher's Exact Test, $p < 0.01$). This implies that employed patients had more elective CS than unemployed patients.

4.2.5 MEDICAL AID

The medical aid status of women is displayed in Table 4.5

Table 4.5 Medical aid status of the patients

Medical Aid	Total (n=76)	Elective (n=26)	Emergency (n=50)
Yes	4 (5%)	0 (0%)	4 (8%)
No	72 (95%)	26 (100%)	46 (92%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

There were no significant differences between the patients who had elective and emergency CS in terms of medical aid (Fisher's Exact Test, $p = 0.14$).

4.2.6 MATERNAL HABIT OF SMOKING

Table 4.6 shows the comparison between women who smoked and elective as well as emergency CS

Table 4.6 Patients who smoke

Maternal smoking habits	Total (n=76)	Elective (n=26)	Emergency (n=50)
Yes	15 (20%)	4(15%)	11 (22%)
No	61 (80%)	22 (85%)	39 (78%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

There were no significant differences between the patients who had elective and emergency CS in terms of maternal habit of smoking (Fisher's Exact Test, $p = 0.49$).

4.2 REFERRAL

Table 4.7 shows the referral patterns from different facilities. The greatest percentage (42%) of women who had CS were from Calvinia and only few were from Middelpos (2%)

Table 4.7 Referral from different clinics

Transferred From	Total (n=76)	Elective (n=26)	Emergency (n=50)
Brandvlei	6 (8%)	3 (12%)	3 (6%)
Williston	8 (11%)	5 (19%)	3 (6%)
Loeriesfontein	8 (11%)	3 (12%)	5 (10%)
Frazerburg	11 (14%)	3 (12%)	8 (16%)
Calvina	32 (42%)	7 (27%)	25 (50%)
Niewoudtville	5 (7%)	1 (4%)	4 (8%)
Middelpos	2 (3%)	0 (0%)	2 (4%)
Sutherland	4 (5%)	4 (15%)	0 (0%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

There were significant differences between the patients who had elective and emergency CS in terms of transfer from different clinics (Chi-square Test, $p < 0.03$).

4.3 CLINICAL PROFILE

4.3.1 GRAVIDITY

Table 4.8 reflects the number of children and the type of CS intervention

Table 4.8 Gravidity status of the patients

Gravidity	Total (n=76)	Elective (n=26)	Emergency (n=50)
Median (IQR)	2 (1-3)	2 (1.7 -3)	2 (1-3)
1	29 (38%)	6 (23%)	23 (46%)
2	24 (31%)	13 (50%)	11 (22%)
3	17 (22%)	6 (23%)	11 (22%)
4	2 (3%)	0 (0%)	2 (4%)
5	2 (3%)	0 (0%)	2 (4%)
6	2 (3%)	1 (4%)	1 (2%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

There were no significant differences between the patients who had elective and emergency CS in terms of gravidity (primigravida and multigravida) (Fisher's Exact Test, $p=0.08$).

4.3.2 GESTATIONAL AGE AT FIRST VISIT

Table 4.9 describes the distribution of gestational age at first antenatal visit. The gestational age ranged between 15-28 weeks for the majority (59) of women out of the total number (76) of women who had CS.

Table 4.9 Gestational age at patients' first antenatal visit

Gestational age in Weeks at first visit	Total (n=76)	Elective (n=26)	Emergency (n=50)
Median (IQR)	20 (16-24)	20 (17-23)	21 (16-24)
0 - 14 weeks	11 (14.5%)	3 (11.5%)	8 (16%)
15 – 28 weeks	59 (77.6%)	20 (77%)	39 (78%)
Above 28 weeks	6 (7.9%)	3 (11.5%)	3 (6%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

There were no significant differences in gestational age at first visit between the patients who had elective and emergency CS (Mann Whitney's U test, $p=0.81$).

4.3.3 ANTENATAL VISITS

The distribution of antenatal visits is described in Table 4.10. The minimum and maximum visits for group 0-3 and > 4 were 7 and 69 respectively. An overwhelming number (69) of the total study population (76) attended more than four times and more. There was no significant differences in number of antenatal visits between the patients who had elective and emergency CS (Mann Whitney's U test, $p=0.46$).

Table 4.10 Patients number of antenatal visits

Antenatal Visits	Total (n=76)	Elective (n=26)	Emergency (n=50)
Median (IQR)	7 (5-8)	6 (4.7-8)	7 (5-8)
0 – 3	7 (9.2%)	3 (11.5%)	4 (8%)
Above 4	69 (90.8%)	23 (88.5%)	46 (92%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

4.3.4 MATERNAL DISEASES DURING PREGNANCY

The maternal diseases are described in Tables 4.11 and 4.12

Table 4.11 Patients with medical diseases during pregnancy

Maternal Disease	Total (n=76)	Elective (n=26)	Emergency (n=50)
Yes	12 (16%)	6 (23%)	6 (12%)
No	64 (84%)	20 (77%)	44 (88%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

There were no significant differences between the patients who had elective and emergency CS in terms of maternal diseases (Fisher's Exact Test, $p = 0.32$).

Table 4.12 Medical diseases

Maternal disease specified	Total (n=76)	Elective (n=26)	Emergency (n=50)
Hypertension	9 (75%)	6 (100%)	3 (50%)
Epilepsy	1 (8%)	0 (0%)	1 (17%)
Asthma	1 (8%)	0 (0%)	1 (17%)
Thyroid	1 (8%)	0 (0%)	1 (17%)
TOTAL	12 (100%)	6 (100%)	6 (100%)

4.3.5 GESTATIONAL AGE AT DELIVERY

The distribution of gestational age at delivery is described in Table 4.13. The minimum and maximum ages were 30 week and 42 week respectively. There were significant differences in gestational age at delivery between the patients who had elective and emergency CS (Mann Whitney's U test, $p=0.03$). The gestational age at delivery for patients who had elective CS was significantly less than patients who had emergency CS.

Table 4.13 Gestational age at delivery

	Total (n=76)	Elective (n=26)	Emergency (n=50)
Median (IQR)	39 (38-40)	40 (36-40)	40 (38-40)

4.3.6 INDICATION FOR CAESAREAN SECTION

The distribution of the determinants of CS is reflected in Table 4.14. Cephalo-pelvic disproportion (36.8 %), foetal distress (26.3%) and previous CS (15.8%) were the most common indications for the intervention.

Table 4.14 Indication for CS

	Total (n=76)	Elective (n=26)	Emergency (n=50)
Antepartum haemorrhage	7 (9.2%)	0 (0%)	7 (14%)
Pregnancy induced hypertension	7 (9.2%)	4 (15.4%)	3 (6%)
Post maturity	1 (1.3%)	1 (3.8%)	0 (0%)
Previous CS	12 (15.8%)	12 (46.2%)	0 (0%)
Previous ectopic pregnancy	1 (1.3%)	1 (3.8%)	0 (0%)
Cephalo pelvic disproportion	28 (36.8%)	9 (34.6%)	19 (38%)
Failed induction	2 (2.6%)	0 (0%)	2 (4%)
Prolonged labour	6 (7.9%)	0 (0%)	6 (12%)
Foetal distress	20 (26.3%)	0 (0%)	20 (40%)
Intra uterine death	1 (1.3%)	1 (3.8%)	0 (0%)
Abnormal presentation	2 (2.6%)	2 (7.7%)	0 (0%)

4.4 MATERNAL COMPLICATIONS

The distribution of maternal complications related to CS are shown in Table 4.15

Table 4.15 Maternal complications

Maternal complications	Total (n=76)	Elective (n=26)	Emergency (n=50)
Complications present	3 (4%)	0 (0%)	3 (6%)
Complications absent	73 (76%)	26 (100%)	47 (94%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

There was numerically more complications in the emergency CS group (3/50; 6%) than the elective CS group (0/26; 0%) but difference is not statistically significant between the patients who had elective and emergency CS in terms of maternal complications (Fisher's Exact Test, $p = 0.20$). The complications include aspiration (1), and infection (2). Caesarean wound infection was associated with long operating time.

4.5 MATERNAL OUTCOMES

Table 4.16 presents maternal outcomes related to CS

Table 4.16 Maternal outcomes

Maternal outcome	Total (n=76)	Elective (n=26)	Emergency (n=50)
Discharge	74 (97%)	26 (100%)	48 (96%)
Transfer	2 (3%)	0 (0%)	2 (4%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

There were no significant differences between the patients who had elective and emergency CS in terms of maternal outcomes (Fisher's Exact Test, $p = 0.30$).

4.6 NEONATAL COMPLICATIONS AND HEALTH OUTCOMES

All the babies were discharged home. Table 4.16 depicts neonatal outcomes related to CS

Table 4.17 Neonatal complications

Neonatal complications	Total (n=76)	Elective (n=26)	Emergency (n=50)
Yes	1 (1%)	0 (0%)	1 (2%)
No	74 (99%)	26 (100%)	49 (98%)
TOTAL	76 (100%)	26 (100%)	50 (100%)

There were no significant differences between the patients who had elective and emergency CS in terms of neonatal outcomes (Fisher's Exact Test, $p = 0.46$). The complications include bradycardia (1).

CHAPTER 5

DISCUSSION

In this chapter, the results obtained from the analysis of the data are discussed and compared with those from other published studies. Furthermore, in some instances the researcher attempted to explain the findings according to his own hypothesis. Although not every aspect of the findings is discussed in this chapter, selected topics from the study are covered.

5.1 INTRODUCTION

This is the first study in a district hospital in the Northern Cape and it was undertaken against the backdrop of a rise in the CS deliveries internationally and the objectives of the MDG's (Millennium Development Goals). The fifth MDG aims to improve maternal health through the reduction of the maternal mortality ratio by three quarters.

Data of a total of 76 women who had CS over a period of eighteen months was reviewed. The aim was to describe socio-demographic, clinical and service related factors that may influence CS at the Abraham Esau District Hospital as well as maternal and neonatal outcomes related to CS.

5.2 THE RATE OF CS IN TERMS OF EMERGENCY AND ELECTIVE INTERVENTIONS

The CS rate of 16.4% in this study was higher than the recommended level of the WHO of 5-15%, (WHO, UNFPA, UNICEF and AMDD. 2009) and exceeds the provincial standard by 4%. The rates for elective and emergency CS were 5.6% and 10.8% respectively. More emergency CS than electives were performed. Out of a total 76 cases, 50 (66%) were emergencies and 26 (34%) were electives. This rate raises questions regarding the quality of obstetric care in an environment of competing needs and limited resources. This higher rate of emergency CS suggests that there is a need to investigate the factors that may explain this trend.

5.3 PROFILE OF WOMEN WHO HAD A CAESAREAN SECTION DURING THE STUDY PERIOD

5.3.1 DEMOGRAPHIC PROFILE

In this study, 43% and 32% of the CS were performed in patients within the age range 18-25 and 26-35 respectively. This might be because these age groups represent the more productively active age groups. Age is often presented as a proxy for accumulated experience, including the use of health service. Older women are often regarded to be more confident and influential in decision making than younger women more specially adolescents. However, no statistically significant differences were found between patients who had elective CS and those who had emergency in terms of age. However, a significant number of patients (9/10) in the age range 13-17 had emergency CS. This could be as result of late presentation at healthcare facility.

Single or divorced women may be poorer with resultant poor use of services and enjoy greater autonomy than those currently married resulting in better service utilization. The majority of patients 58 (76%) in the study population of 76 are single, 17 (23%) are married and 1(1%) widowed. This study found no significant differences among the patients who had elective and emergency CS in terms of marital status.

The association between the type of CS and employment status of the women may not be unrelated to international trends, where caesarean births are associated with patient's request, patients' demand for the intervention and or better antenatal care. A total of 65 (85%) of the study population of 76 were unemployed, eight out of a total of the 11 employed patients had elective CS compared to only 3 who had emergency CS.

Having a medical aid is associated with higher financial resources and anticipated greater use of services. Only 4 (5%) of the study population of 76 had medical aid cover. No statistically significant differences between patients who had elective CS

and those who had emergency CS were found probably because of small sample size.

Out of the study population of 76, 15 (20%) had the habit of smoking as opposed to 61 who did not. There were no significant differences between the patients who had elective and emergency CS with regards to maternal habit of smoking.

The area of residence had a significant association with the type of delivery and may dependent on access. Generally most patients who were transferred-in had emergency CS. There were also variations by area which might suggest area specific factors in clinical care and maternity care practices. Calvinia contributed a total of 25 (50%) of the patients 50 who had emergency CS. This is so because it has the largest population. There were significant differences between patients who had elective CS and those who had emergency CS in terms of transfer from different clinics. Middelpoort had the highest emergency rate, 2 (100%) out of a total of 2. Middelpoort does not have a fulltime clinic. Sutherland and Williston had the highest elective CS rates of 100% (4/4) and 63% (5/8). These variations should be further investigated for targeted and context appropriate interventions. It may be useful to consider distance together with service quality and transport options.

5.3.2 CLINICAL PROFILE

The CS rate for primigravidae was 38% of the total study population. This is cause for concern because of the implications of CS on the future reproductive carrier of this group of patients especially in the light of future CS. Gravidity had no significant influence between patients who elective CS and those who had emergency CS.

A total of 12 patients' out of the study population of 76 had a specified medical condition. Elective CS were performed on 9 (75%) of the patients who were treated for and diagnosed with hypertension.

Cephalo pelvic disproportion (36.8 %) accounted for more than one-third cases. Studies found that nutritional factors have dominant influence on pelvic size and shape and malnutrition especially during childhood result in pelvic contraction and general growth stunting (Myerscough, 1993). The high incidence of CS may not be unrelated to malnutrition that is largely associated with high level of poverty and rampant unemployment.

Foetal distress accounted for 26% of the total CS performed and was the second highest indication for CS. This high value may not be unrelated to clinical practices regarding foetal monitoring during labour in the absence of electronic foetal heart rate monitoring equipment in the Hospital. The diagnosis largely depends on clinical signs which might be associated with incorrect decisions.

Previous CS constituted the third highest indication and this might be because clinicians regard vaginal birth after previous CS as a high risk option (Geidam, Audu, Kawuwa, et al., 2009).

Among the total of 50 emergency CS performed, most of the indications were cephalo-pelvic disproportion (19), foetal distress (20) and prolonged labour (6). This might be indicative of the quality of obstetric management or lack of proper care on the part of the Hospital. It might also reflect the lack capacity of the nurses to accurately assess patients prior to the onset of active labour in the Maternity Unit of the Hospital.

There were no significant differences in gestational age at first ANC visit and the number of antenatal visits between patients who had elective CS and those who had emergency CS.

The majority of the CS were performed as an emergency yet surprisingly all patients were booked. It would have been expected that the emergency CS among the unbooked population would be higher, since it is an unbooked status that was related to higher incidence of emergency CS (Oladapo, Sotunsa and, Sule-Odu, 2004). This study found that the Namakwa District had been able to improve antenatal care visits within the district. Now, the health professionals are

required to be more vigilant with early diagnosis of medical and obstetric conditions to reduce emergency interventions.

There were significant differences in gestational age at delivery between patients who had elective CS and those who had emergency CS. The gestational age at delivery for patients who had elective CS was significantly less than patients who had emergency CS.

5.4 MATERNAL AND NEONATAL HEALTH OUTCOMES

There is evidence that women undergoing CS deliveries, emergency or elective, independent of demographic and clinical characteristics had double the risk for severe maternal morbidity and mortality and up to five times the risk for a postpartum infection compared to women undergoing vaginal delivery (Villar, Carroli, Zavaleta, et al, 2007). One out three patients who had complications was transferred to the regional hospital for management. Caesarean wound infection is a major cause of prolonged hospital stay, high hospital bills as well as other morbidity and mortality (Ezechi, Edet, Akinlade, et al., 2009). In this study, only a few patients (3, 4%) had complications. The complications included aspiration (1) and infection (2). There were no significant differences in terms of maternal complications between patients who had elective CS and those that had emergency CS. The patients who had infection stayed longer than other patients.

All patients were discharged home. There were no maternal deaths during the study period. This study found no significant differences between patients who had elective CS and patients who had emergency CS in terms of neonatal outcomes. Only one baby had a complication (bradycardia).

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the results are assessed in relation to the aims of the study, so that conclusions can be drawn. The limitations of the study are analysed and recommendations are made with reference to the findings of the study. These recommendations focus on the provision of appropriate management of pregnant women undergoing caesarean sections in district hospitals. Finally, ideas for further research are presented.

6.1 CONCLUSIONS RELATED TO THE OBJECTIVES OF THE STUDY

The broad objective of this study was to determine the CS frequency in a district hospital in South Africa for an eighteen month period and to identify some factors which might influence that frequency and their outcomes.

6.1.1 DESCRIPTION OF THE RATE OF CS IN TERMS OF EMERGENCY AND ELECTIVE INTERVENTIONS

The CS frequency in the Hospital was relatively higher than the provincial norms. There was more emergency CS performed during the study period than elective CS.

6.1.2 DESCRIPTION OF THE PROFILE OF WOMEN WHO HAD A CS DURING THE STUDY PERIOD

There were clear social and economic disparities in the study group. More women were single, unemployed; had no medical aid and all came from a homogenous population group. Most of the women were transferred from the surrounding towns. All the women had booked showing improved awareness and maternal service delivery in the area.

6.1.3 CLINICAL PROFILE

The most frequent indications for the CS were cephalo-pelvic disproportion, foetal distress and previous CS. This might be due to lack of proper assessment and monitoring during labour. It might reflect the lack of capacity to accurately assess patients prior to the onset of active labour in facilities where there are no medical practitioners. This highlights the need for continuous monitoring and evaluation of the quality of obstetric management offered at the Hospital.

6.1.4 DESCRIPTION OF THE MATERNAL AND NEONATAL HEALTH OUTCOMES

The maternal and neonatal morbidities were 0% and 0.01% respectively, which were well below the <1% level, the WHO recommends. Only two cases of post-caesarean wound infection were identified in this study, which were associated with longer hospital stay.

6.1.5 DETERMINATION OF THE ASSOCIATION BETWEEN THE TYPE OF CS AND (A) PROFILE OF THE WOMEN AND (B) MATERNAL AND NEONATAL OUTCOMES

There was higher chance of an emergency CS in pregnant women who were primigravidae, teen-ager and if referred from outside. There were no statistically significant association between the type of CS and the maternal and neonatal outcomes.

6.2 LIMITATIONS OF THE STUDY

The missing data and completeness of the electronic database were one of the limitations of the study (less than 5% cases). However, the researcher managed to retrieve the missing information from patients' records.

The study only considered maternal and neonatal outcomes in terms of discharge, transfer and death, but did not look into long term adverse outcomes.

6.3 RECOMMENDATIONS

6.3.1 USE OF FINDINGS OF THE STUDY

The formulation and implementation of guidelines to assist physicians and to facilitate decision to operate, especially in cases of primigravidae and women who had a previous caesarean section are strongly recommended. Another aspect of obstetric management that needs more attention is trial vaginal birth after caesarean section.

The results of this study will be presented to the District and Provincial Health Departments with the view of presenting a model that can be used and roll out in other district hospitals in the Northern Cape Province. It is hoped that Northern Cape Department of Health will utilise the findings of this study to set up an effective monitoring and evaluation system for CS performed in the district hospitals particularly for pelvimetry examination and electronic monitoring of foetal heart by cardiotocograph machines. However, lack of cardiotocograph machines at health facilities will be major hindrance to implement this system.

6.3.2 FUTURE RESEARCH

The following are the areas of research, which the researcher believes are important, as the findings would both enlighten health professionals in the management of CS and benefit patients by improvement in the provision of services.

- A comparative study of socio-demographic and clinical profiles between pregnant women who had normal delivery and those who had CS in the District.
- A descriptive study on pelvimetry examination of the women who delivered at the health facilities in the district.

- A study based on the choices of physicians and patients versus the condition of patients as well as the associated costs of CS to the health care system.

6.4 SUMMARY AND CONCLUSIONS

The CS rate of 16.4% reported in this study is higher than the WHO recommendation (15%) for developing countries and therefore is cause for concern. The majority of patients who had CS were single, unemployed and had no medical aid.

The higher rate of emergency CS (66%) in comparison to elective CS (34%) would require an assessment of maternal health care offered within the District. The study found that emergency CS were more commonly done among teenagers under the age of eighteen. Emergency CS were also more commonly performed among patients who were transferred from surrounding clinics (20.8%).

The findings of this study will be useful to develop a better understanding of the CS rate at this Hospital and could be utilized by referring clinics and community health centres as well as other district hospitals for the improvement of maternal health care service. The findings could also serve as a base for informed decision-making, accurate planning, appropriate interventions, and optimal resources utilization. Further to this it could be a reference for future projects of similar nature for academic and clinical purposes.

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APPENDICES

APPENDIX A
ETHICS CLEARANCE CERTIFICATE

APPENDIX B
DATA COLLECTION TOOLS